

Otter Population Analyses 2004

By Robert E. Rolley and Amber M. Roth

Abstract

Estimates of Wisconsin's otter population declined approximately 20% from about 15,600 animals in 1996 to 12,500 in fall, 2003. The WDNR Furbearer Advisory Committee recommended a harvest goal of 1,200 otters for the 2004-05 trapping season which should allow for slight increase in the population increase. Otter track detection rates on aerial surveys in 2004 were similar to those in 2003.

Introduction

Kohn and Ashbrenner (1984) described earlier attempts to obtain age and reproductive data for Wisconsin otters via carcass collections. They also tested an aerial survey to estimate otter population trends, and attempted to estimate the statewide population and allowable harvests. This report summarizes and compares data collected since then, and discusses future data collections necessary to continue and refine Wisconsin's otter monitoring and harvest management capabilities.

Methods

Wisconsin trappers are required to register their otters with the DNR. The area of kill (county and deer management unit), date of kill, sex of the animal, type of trap used, and the name and address of the trapper were recorded for each animal registered.

Trappers were also required to periodically turn in their otter carcasses. Carcass collections were conducted in 1979-82, 1994-95, 1998-99, and 2001-02. A canine tooth was extracted from each carcass and all teeth were x-rayed. Kits were identified by the presence of an open foramen and wide pulp cavity (\geq half the tooth width) (Kuehn and Berg 1983). Teeth from otters \geq 1 year were sent to Matson's Laboratory, Milltown, MT for processing and aging by counting annuli in the cementum. Ovaries were removed from all female carcasses and stored in 10% formalin until they were firm enough to hand section. The sections were then examined for presence of corpora lutea. These data were incorporated into the Minnesota Furbearer Population Model to obtain statewide otter population estimates and trends. Chi-square tests and analysis of variance were used to assess regional differences in sex and age structure and reproductive data during 2004.

Development of an aerial survey to estimate regional otter population trends began in February 2001. The aerial survey involved recording the presence or absence of otter tracks at stream and river crossings along 30-mile long transects within each Otter Management Zone (Figs. 1 and 2). The transects selected had \geq 8 stream crossings in each to provide adequate sample sizes, and were located to provide an even distribution within each Management Zone. GPS locations for the western and eastern end points of each transect were established to insure that the same transects were surveyed each year. Twenty-three permanent transects were established in each Otter Management Zone.

Transects were surveyed from Cessna 172 and 182 aircraft using 2 observers plus the pilot. Surveys were conducted between 9am and 3pm on bright, sunny days 1-5 days after a

significant ($>2''$) snowfall. The date, days since snow, cloud cover, and observers names were recorded when each transect was surveyed. At each stream/river crossing, the pilot circled the plane as low as necessary to thoroughly search for otter tracks. The presence or absence of otter tracks, and ice conditions were recorded at each crossing.

Based on analysis of the data collected during 2001-03, Kohn and Roth (2003) recommended that the aerial survey be adopted as an operational field survey. The Wisconsin Trappers Association donated funding for survey flights in 2004 and 2005. Wildlife Management personnel were trained in survey procedures during 2004.

Results

Age structure and reproductive rates

Age data has been obtained from 2,111 male and 1,552 female otters harvested to date (Tables 1 and 2). Age distributions were similar between sexes. Kits comprised approximately 45% of the harvest, yearlings about 22%, and adults approximately 33%. The mean age for both male and female otters harvested was 2.3 years. Of these, 6 males and 6 females were 13 years old or older with the oldest being a 15 year old male. The age structure in the harvest was very similar in all 5 collections.

Ovaries and uterine horns were collected and examined from 747 otters since 1979 (Table 3). Pregnancy rates (based on *corpora lutea*) averaged 32% for yearlings and 75% for adults. Average litter sizes were 1.7 for yearlings and 2.2 for adults. The mean number of embryos per adult female was 2.3.

Mean litter sizes for yearling and adult otters, and adult pregnancy rates have remained relatively stable since otter carcass collections began in 1979. But, it appears that yearling pregnancy rates may have increased recently. Yearling pregnancy rates of otters collected during 1979-95 were only around 10% as compared to yearling pregnancy rates of around 45% for those collected during the 1998-99 and 2001-02 trapping seasons. The more recent yearling pregnancy rates may be used to update our otter population model.

Carcass data were grouped into 3 time periods for analysis of regional differences; 1980-81, 1994, and 1998-2001. Sex ratios of harvested otters were similar among management zones in 1980-81 and 1994 ($P > 0.80$) but differences were nearly significant in 1998-01 ($P = 0.05$). In 1998-01, males comprised 52% of the harvest in the North Zone, 61% in the Central Zone, and 56% in the South Zone.

Data were insufficient for valid tests of differences among otter management zones in harvest age structure for both sexes in 1980-81 and for females in 1994 (Table 4). Harvest age structure was similar among zones for females in 1998-01 ($P = 0.33$). Age structure of harvested males differed among zones in 1994 ($P = 0.02$) and 1998-01 ($P = 0.003$). In 1994 fewer than expected males in the South Zone were juveniles and more than expected were adults (≥ 2.5 years old). Similarly, in 1998-01 fewer than expected males were juveniles and more than expected were adults in the South Zone while more than expected were juveniles and fewer than expected were adults in the North Zone.

Limited sample sizes precluded tests for differences in pregnancy rates among management zones in 1980-81 and 1994. Pregnancy rates of adults were similar among zones in 1998-01 ($P = 0.63$). In contrast, pregnancy rates of yearlings were higher in the North Zone (70%) than in

the Central (24%) or South (30%) zones. Litter size during 1998-01 did not differ among zones for yearlings ($P = 0.94$) or adults ($P = 0.64$).

These analyses suggest that region specific data on reproductive rates and harvest sex and age composition will be needed for development of zone specific population models. The lower yearling pregnancy rates in the Central and South zones and lower percentage of juvenile males in the harvest in the South Zone suggest that there may be regional differences in habitat quality or prey availability that may be affecting the productivity of regional populations and should be considered in future refinements of harvest management strategies.

Population Estimates

Population estimates calculated by our computer model suggested that the statewide otter population increased rather steadily from approximately 12,600 animals in 1982 to 15,600 in 1996, and then declined down to 12,500 otters in 2003 (Table 5). It appeared that the population declined substantially when harvest rates exceeded 15% of the prehunt population. Harvests have exceeded that level during 4 years between 1996 and 2002. As a result, the statewide otter populations in fall, 2002 and 2003 were at, or slightly below, our population goal of "a minimum of 13,000 otters in the State". The 2003-04 harvest of 1,588 (13% of the fall population) exceeded the recommended harvest goal of 1,200 but may have allowed for slight growth of the population.

The WDNR Furbearer Advisory Committee recommended a harvest goal of 1,200 otters for the 2004-05 trapping season. This includes 720 otters in the North Zone, 300 in the Central Zone, and 180 in the South Zone. The population model suggested that that level of harvest would result in a slight increase in the statewide population.

Aerial Survey

All transects in the North Zone were surveyed in 2004, but due to limited snow conditions, only 11 of 23 transects in the Central Zone and 21 of 23 transects in the South Zone were completed (Table 6). Two hundred-eighty stream and river crossings were examined in the North Zone, 115 in the Central Zone, and 262 in the South Zone. Otter tracks were detected at 19%, 14% and 4% of the stream and river crossings in the North, Central, and South zones, respectively. Track detection rates were the same as 2003 in the North and Central zones and slightly lower in the South Zone.

Although it appears that otter track observation rates can be used to monitor changes in relative densities of otters within each management zone, it will be necessary to measure the amount of suitable otter habitat in each zone to determine relative numbers of otters in the zones. The amount of otter habitat and the frequency of otter tracks in each zone can then be used to estimate the proportion of the statewide otter population present in each management zone. This will be needed to develop individual population models for each management zone.

Literature Cited

Kohn, B. E. and J. E. Ashbrenner. 1984. Harvest and population status of river otter in Wisconsin. Wis. Dep. Nat. Resour. Research Report 129. 16pp.

Kohn, B. E. and A. M. Roth. 2003. Development of an aerial otter survey in Wisconsin. Pittman-Robertson Final Report. Wisc. Dep. Nat. Resour., Madison, WI.

Kuehn, D. W. and W. E. Berg. 1983. Use of radiographs to age otters. Wildl. Soc. Bull. 11(1):68-70.

Table 1. *Percentage of male otters harvested in Wisconsin in age class, 1979-2002.*

| Age Class | 1979-80 | 1980-81 | 1981-82 | 1994-95 | 1998-99 | 2001-02 | All |
|--|---------|---------|---------|---------|---------|---------|----------|
| Kit | 57 | 50 | 31 | 47 | 47 | 42 | 45.0 |
| 1 | 11 | 12 | 31 | 22 | 23 | 27 | 23.4 |
| 2 | 11 | 6 | 13 | 11 | 8 | 12 | 10.3 |
| 3 | 8 | 7 | 9 | 8 | 7 | 7 | 7.6 |
| 4 | 5 | 3 | 13 | 6 | 3 | 3 | 4.2 |
| 5 | 3 | 3 | 0 | 3 | 4 | 1 | 2.7 |
| 6 | 0 | 5 | 0 | 2 | 3 | 3 | 2.8 |
| 7 | 0 | 3 | 0 | 1 | 2 | 1 | 1.1 |
| 8 | 0 | 5 | 2 | 1 | 1 | 0 | 0.9 |
| 9 | 3 | 1 | 0 | 1 | 0 | 1 | 0.7 |
| 10+ | 2 | 5 | 0 | 0 | 3 | 1 | 1.5 |
| No. Aged | 37 | 119 | 45 | 663 | 604 | 643 | 2,111 |
| Mean Age (assume age class kit = 0.75 yrs; age class 1 = 1.75 yrs; etc.) | | | | | | | 2.3 yrs. |

Table 2. *Percentage of female otters harvested in Wisconsin in age class, 1979-2002.*

| Age Class | 1979-80 | 1980-81 | 1981-82 | 1994-95 | 1998-99 | 2001-02 | All |
|--|---------|---------|---------|---------|---------|---------|----------|
| Kit | 59 | 57 | 46 | 45 | 49 | 39 | 45.5 |
| 1 | 5 | 9 | 10 | 18 | 21 | 25 | 20.1 |
| 2 | 9 | 4 | 17 | 17 | 9 | 11 | 11.9 |
| 3 | 5 | 6 | 10 | 8 | 5 | 9 | 7.3 |
| 4 | 18 | 8 | 5 | 5 | 3 | 5 | 4.8 |
| 5 | 0 | 1 | 10 | 1 | 2 | 4 | 2.7 |
| 6 | 0 | 4 | 2 | 3 | 3 | 2 | 2.7 |
| 7 | 0 | 4 | 0 | 1 | 3 | 1 | 1.7 |
| 8 | 5 | 3 | 0 | 1 | 2 | 1 | 1.3 |
| 9 | 0 | 1 | 0 | 0 | 1 | 0 | 0.5 |
| 10+ | 0 | 4 | 0 | 1 | 2 | 2 | 1.7 |
| No. Aged | 22 | 102 | 41 | 445 | 465 | 477 | 1,552 |
| Mean Age (assume age class kit = 0.75 yrs; age class 1 = 1.75 yrs; etc.) | | | | | | | 2.3 yrs. |

Table 3. *Reproductive data from female otters collected in Wisconsin.*

| Age Class | Trapping Seasons | | | | All Seasons |
|------------------------------|------------------|---------|---------|---------|----------------|
| | 1979-82 | 1994-95 | 1998-99 | 2001-02 | |
| Yearlings (Age Class 1) | | | | | |
| Number examined | 9 | 94 | 82 | 94 | 279 |
| Number with corpora lutea | 1 | 9 | 38 | 41 | 89 |
| Mean number of corpora lutea | 1.0 | 1.8 | 1.9 | 1.8 | 1.7 |
| Percent pregnant | 11 | 10 | 46 | 44 | 32 |
| Number with embryos | 0 | 0 | 0 | 2 | 2 |
| Mean number of embryos | | | | 2.0 | 2.0 |
| Adults (Age Class 2+) | | | | | |
| Number examined | 53 | 158 | 117 | 140 | 468 |
| Number with corpora lutea | 44 | 99 | 102 | 104 | 349 |
| Mean number of corpora lutea | 2.3 | 2.2 | 2.3 | 2.1 | 2.2 |
| Percent pregnant | 83 | 63 | 87 | 74 | 75 |
| Number with embryos | 14 | 0 | 16 | 10 | 40 |
| Mean number of embryos | 2.4 | | 2.4 | 2.1 | 2.3 |

Table 4. *Sex-specific age composition of otters harvested within management zones, 1980-2001.*

| Sex | Time Period | Zone | N. aged | % in age class | | |
|---------|-------------|---------|---------|----------------|-----|------|
| | | | | 0.5 | 1.5 | ≥2.5 |
| Females | 1980-81 | North | 108 | 57 | 10 | 32 |
| | | Central | 33 | 52 | 3 | 45 |
| | | South | 4 | 25 | 25 | 50 |
| | 1994 | North | 281 | 40 | 22 | 38 |
| | | Central | 101 | 47 | 18 | 36 |
| | | South | 10 | 50 | 30 | 20 |
| | 1998-01 | North | 215 | 41 | 22 | 37 |
| | | Central | 136 | 36 | 24 | 40 |
| | | South | 82 | 45 | 28 | 27 |
| Males | 1980-81 | North | 98 | 47 | 14 | 39 |
| | | Central | 34 | 35 | 21 | 44 |
| | | South | 4 | 0 | 100 | 0 |
| | 1994 | North | 430 | 45 | 24 | 31 |
| | | Central | 156 | 51 | 17 | 32 |
| | | South | 16 | 13 | 25 | 63 |
| | 1998-01 | North | 238 | 46 | 31 | 23 |
| | | Central | 212 | 39 | 28 | 33 |
| | | South | 107 | 35 | 22 | 44 |

Table 5. *Wisconsin otter population estimates and harvests, 1982-2004.*

| Year | Preharvest Population ^a | Harvest | Harvest Rate (%) |
|---------|---------------------------------------|---------|---------------------|
| 1982-83 | 12,580 | 960 | 8 |
| 1983- | 12,810 | 995 | 8 |
| 1984- | 13,150 | 1,213 | 9 |
| 1985- | 13,200 | 960 | 7 |
| 1986- | 13,600 | 1,588 | 12 |
| 1987- | 13,350 | 1,724 | 13 |
| 1988- | 12,970 | 1,140 | 9 |
| 1989- | 13,250 | 1,294 | 10 |
| 1990- | 13,350 | 818 | 6 |
| 1991- | 14,070 | 883 | 6 |
| 1992- | 14,740 | 1,060 | 7 |
| 1993- | 15,300 | 1,212 | 8 |
| 1994- | 15,750 | 1,900 | 12 |
| 1995- | 15,460 | 1,599 | 10 |
| 1996- | 15,570 | 2,521 | 16 |
| 1997- | 14,890 | 2,809 | 19 |
| 1998- | 13,960 | 1,631 | 12 |
| 1999- | 14,210 | 2,278 | 16 |
| 2000- | 13,760 | 1,945 | 14 |
| 2001- | 13,720 | 2,701 | 19 |
| 2002- | 12,840 | 2,096 | 16 |
| 2003- | 12,530 | 1,588 | 13 |
| 2004- | 12,740 | --- | --- |

^aWisconsin's otter population goal is a preharvest minimum of 13,000 animals.

Table 6. *Results from aerial otter surveys conducted in 2001-2004.*

| Otter Management Zone | 2001 | 2002 | 2003 | 2004 |
|----------------------------------|------|------|------|------|
| North | | | | |
| No. Transects Surveyed | 18 | 23 | 23 | 23 |
| No. Stream/River Crossings | 180 | 257 | 241 | 280 |
| % of Crossings With Otter Tracks | 17 | 25 | 19 | 19 |
| SE (%) | 4.2 | 4.1 | 3.2 | 2.7 |
| Central | | | | |
| No. Transects Surveyed | 0 | 14 | 23 | 11 |
| No. Stream/River Crossings | | 152 | 224 | 115 |
| % of Crossings With Otter Tracks | | 29 | 14 | 14 |
| SE (%) | | 4.0 | 2.5 | 4.3 |
| South | | | | |
| No. Transects Surveyed | 0 | 5 | 23 | 21 |
| No. Stream/River Crossings | | 73 | 245 | 262 |
| % of Crossings With Otter Tracks | | 4 | 7 | 4 |
| SE (%) | | 2.1 | 2.1 | 3.1 |

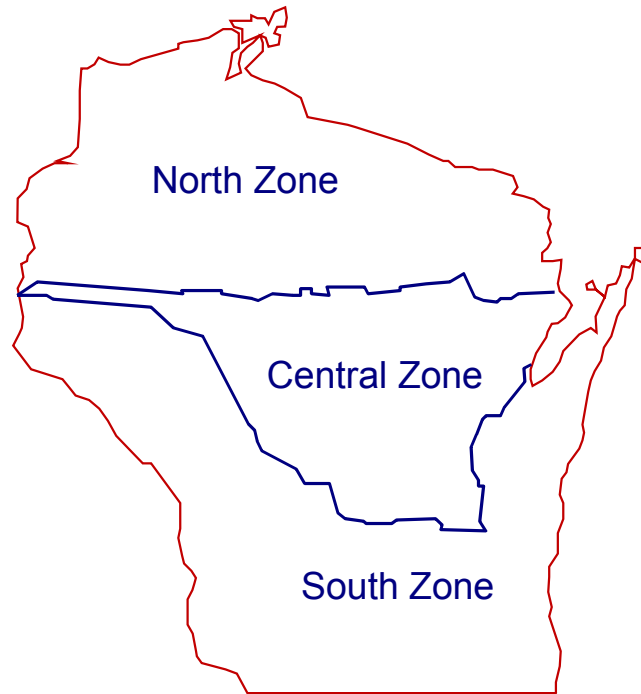


Figure 1. *Wisconsin's Otter Management Zones, 2004.*

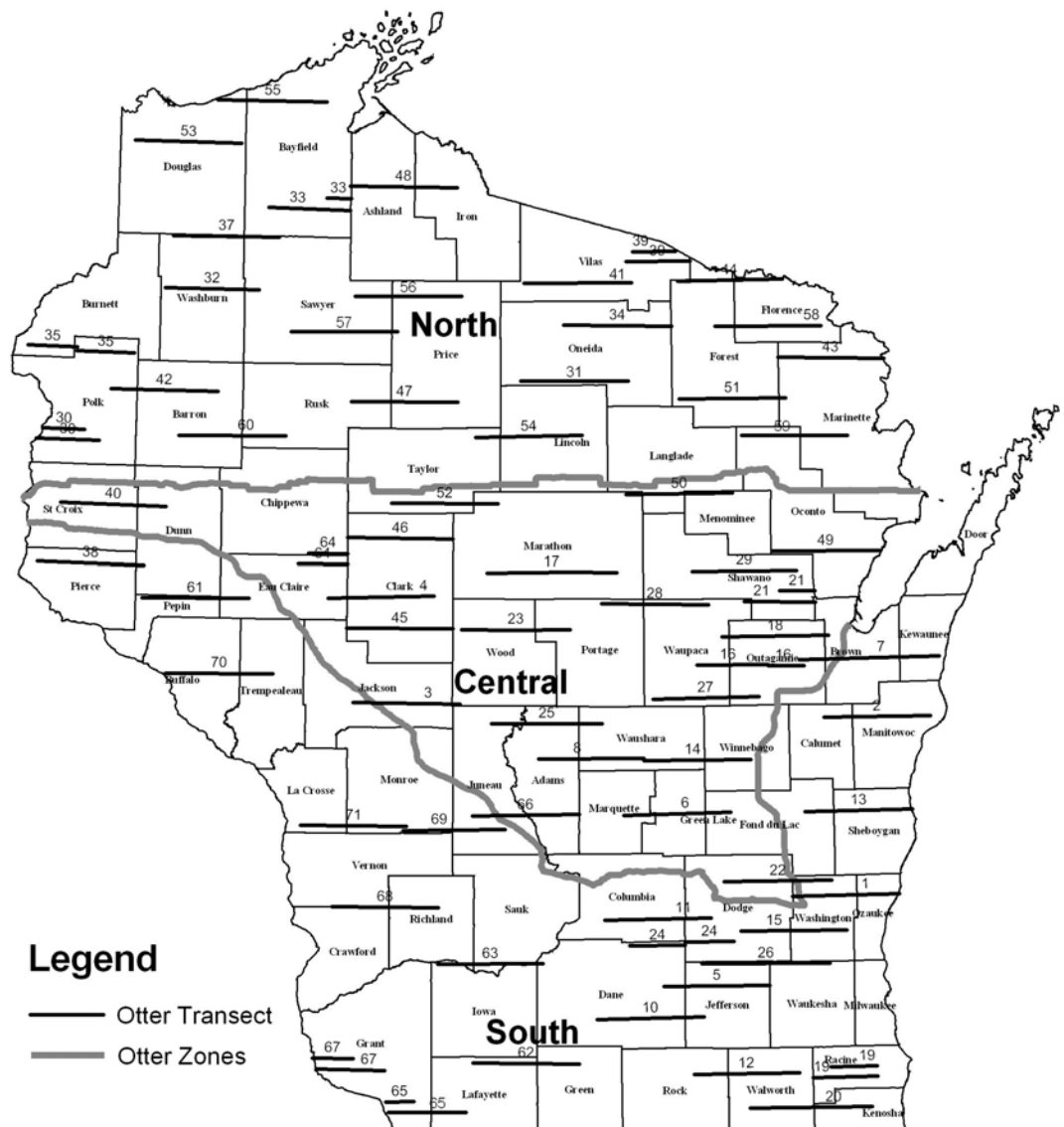


Figure 2. Location of aerial otter transects in Wisconsin.